Claims

What is claimed is:

1. A method for parallel interference cancellation comprising:
   a) generating weighted symbol estimates from symbol estimates corresponding to a plurality of user signals forming at least part of an input signal, wherein each weighted symbol estimate is based on at least one previous symbol estimate for a given symbol;
   b) processing the weighted symbol estimates to provide for:
      i) modulation of the weighted symbol estimates corresponding to each user signal to provide individual modulated signals; and
      ii) filtering the individual modulated signals with channel estimates corresponding to the user signals to create individual regenerated signals;
   c) for each user signal, subtracting individual regenerated signals corresponding to all other user signals from the input signal to create an individual signal;
   d) demodulating each individual signal to provide a corresponding demodulated individual signal; and
   e) processing each demodulated individual signal to determine the symbol estimates for each symbol included therein.

2. The method of claim 1 further comprising repeating steps a through e prior to selecting symbol estimates as final symbol estimates.

3. The method of claim 2 wherein portions of the input signal over subsequent periods are processed in parallel with iterative processing of portions of the input signal over previous periods.

4. The method of claim 1 wherein the step of generating the weighted symbol estimates comprises providing a weighting for each symbol estimate that is based on a consistency of symbol estimates for each symbol.

5. The method of claim 4 wherein the weighting is relatively higher when the consistency of the symbol estimates is higher and relatively lower when the consistency of the symbol estimates is lower.

6. The method of claim 1 wherein the step of generating the weighted symbol estimates comprises implementing a leaky integrator function on successive symbol estimates for a given symbol to create the weighted symbol estimates for the given symbol such that the weighting for each symbol estimate is based on a consistency of symbol estimates for each symbol.

7. The method of claim 1 wherein the step of generating the weighted symbol estimates comprises implementing an averaging integrator function on successive symbol estimates for a given symbol to create the weighted symbol estimates for the given symbol such that the weighting for each symbol estimate is based on a consistency of symbol estimates for each symbol.

8. The method of claim 1 wherein the step of generating the weighted symbol estimates comprises accessing a

look-up table based on a history of successive symbol estimates for a given symbol to determine the weighted symbol estimates for the given symbol.

9. The method of claim 1 wherein the step of processing the weighted symbol estimates and the step of demodulating use unique spreading codes for demodulating the individual signals and modulating the weighted symbol estimates.

10. The method of claim 9 wherein the step of processing the weighted symbol estimates and the step of demodulating further use a common spreading code for further demodulating the individual signals and further modulating the weighted symbol estimates.

11. A system for parallel interference cancellation in association with an input signal including a plurality of user signals comprising:
    a) parallel interference cancellation circuitry adapted to subtract individual regenerated signals corresponding to all other user signals from the input signal to create an individual signal for each user signal;
    b) demodulation circuitry for demodulating each individual signal to provide a corresponding demodulated individual signal;
    c) symbol decision circuitry for processing each demodulated individual signal to determine symbol estimates for each symbol included therein;
    d) symbol processing circuitry adapted to generate a weighted symbol estimate based on at least one

previous symbol estimate for a given symbol for each symbol estimate; and

e) regeneration circuitry adapted to:

i) modulate the weighted symbol estimates corresponding to each individual signal to provide individual modulated signals; and

ii) process the individual modulated signals with channel estimates corresponding to the individual signals to create the individual regenerated signals.

12. The system of claim 11 wherein the individual signals are iteratively processed prior to selecting symbol estimates as final symbol estimates.

13. The system of claim 12 wherein portions of the input signal over subsequent periods are processed in parallel with iterative processing of portions of the input signal over previous periods.

14. The system of claim 11 wherein the symbol processing circuitry provides a weighting for each symbol estimate that is based on a consistency of symbol estimates for each symbol.

15. The system of claim 14 wherein the weighting is relatively higher when the consistency of the symbol estimates is higher and relatively lower when the consistency of the symbol estimates is lower.

16. The system of claim 11 wherein the symbol processing circuitry is adapted to implement a leaky integrator function on successive symbol estimates for a given symbol to create the weighted symbol estimates for

the given symbol such that the weighting for each symbol estimate is based on a consistency of symbol estimates for each symbol.

17. The system of claim 11 wherein the symbol processing circuitry implements an averaging integrator function on successive symbol estimates for a given symbol to create the weighted symbol estimates for the given symbol such that the weighting for each symbol estimate is based on a consistency of symbol estimates for each symbol.

18. The system of claim 11 wherein the symbol processing circuitry accesses a look-up table based on a history of successive symbol estimates for a given symbol to determine the weighted symbol estimates for the given symbol.

19. The system of claim 11 wherein the regeneration circuitry and the demodulation circuitry use unique spreading codes for demodulating the individual signals and modulating the weighted symbol estimates.

20. The system of claim 19 wherein the regeneration circuitry and demodulation circuitry use a common spreading code for further demodulating the individual signals and further modulating the weighted symbol estimates.

21. A system for parallel interference cancellation wherein a plurality of user signals form at least part of an input signal and weighted symbol estimates corresponding to the plurality of user

signals are initially generated, the system comprising:

a) means for processing the weighted symbol estimates to provide for:

i) modulation of the weighted symbol estimates corresponding to each user signal to provide individual modulated signals; and

ii) filtering the individual modulated signals with channel estimates corresponding to the user signals to create individual regenerated signals;

b) means for subtracting individual regenerated signals corresponding to all other user signals from the input signal to create an individual signal for each user signal;

c) means for demodulating each individual signal to provide a corresponding demodulated individual signal;

d) means for processing each demodulated individual signal to determine symbol estimates for each symbol included therein; and

e) means for generating a weighted symbol estimate based on a previous symbol estimate for a given symbol.

22. The system of claim 21 wherein the individual signals are iteratively processed prior to selecting symbol estimates as final symbol estimates.

23. The system of claim 22 wherein portions of the input signal over subsequent periods are processed in parallel with iterative processing of portions of the input signal over previous periods.

24. The system of claim 21 wherein the means for generating a weighted symbol is further adapted to provide a weighting for each symbol estimate that is based on a consistency of symbol estimates for each symbol.

25. The system of claim 24 wherein the weighting is relatively higher when the consistency of the symbol estimates is higher and relatively lower when the consistency of the symbol estimates is lower.

26. A method for parallel interference cancellation comprising:

a) processing symbol estimates corresponding to a plurality of user signals forming at least part of an input signal to provide for:

i) modulation of the symbol estimates corresponding to each user signal to provide individual modulated signals; and

ii) filtering the individual modulated signals with channel estimates corresponding to the user signals to create individual regenerated signals, wherein the individual regenerated signals are represented by chips;

b) generating weighted chips for each chip, wherein each weighted chip is based on at least one previous chip estimate for a given chip and the weighted chips for each individual regenerated signal form weighted individual signals;

c) for each user signal, subtracting weighted individual signals corresponding to all other user signals from the input signal to create an individual signal;

d) demodulating each individual signal to provide a corresponding demodulated individual signal; and

e) processing each demodulated individual signal to determine the symbol estimates for each symbol included therein.

27. The method of claim 26 further comprising repeating steps a through e prior to selecting symbol estimates as final symbol estimates.

28. The method of claim 27 wherein portions of the input signal over subsequent periods are processed in parallel with iterative processing of portions of the input signal over previous periods.

29. The method of claim 26 wherein the step of generating the weighted chips comprises providing a weighting for each chip that is based on a consistency of chips for each symbol.

30. The method of claim 29 wherein the weighting is relatively higher when the consistency of the chips is higher and relatively lower when the consistency of the chips is lower.

31. A system for parallel interference cancellation in association with an input signal including a plurality of user signals comprising:

a) parallel interference cancellation circuitry adapted to subtract weighted individual signals corresponding to all other user signals from the input signal to create an individual signal for each user signal;

b) demodulation circuitry for demodulating each individual signal to provide a corresponding demodulated individual signal;

c) symbol decision circuitry for processing each demodulated individual signal to determine symbol estimates for each symbol included therein;

d) regeneration circuitry adapted to:

i) modulate the symbol estimates corresponding to each individual signal to provide individual modulated signals; and

ii) process the individual modulated signals with channel estimates corresponding to the individual signals to create individual regenerated signals; wherein the individual regenerated signals are represented by chips; and

e) symbol processing circuitry adapted to generate weighted chips for each chip, wherein each weighted chip is based on at least one previous chip estimate for a given chip and the weighted chips for each individual regenerated signal form weighted individual signals.

32. The system of claim 31 wherein the individual signals are iteratively processed prior to selecting symbol estimates as final symbol estimates.